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Links Between Physical and Mental Health: Assessment of Therapeutic Riding's Effect on
Children with Special Needs

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Honors Psychology Thesis

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Abstract

This observational study examined the effect of therapeutic riding (TR) on four domains, physical skills, positive values, social skills, and self-identity in children with special needs. Participants were recruited from SARI Therapeutic Riding and were divided, based on observation, into more or less severe diagnosis categories. It was predicted that children with less severe diagnosis would show more of an increase on the four domains, especially physical skills due to TR. Participants were observed using an observational checklist at pre- and post-riding lessons. Results showed non-significant differences in all four domains, however, there was a tendency for scores to increase from pre- to post-observations. Furthermore, statistically significant overall effects were found between sessions, for diagnoses, in all four domains, $p < .006$. It can be concluded that TR has some beneficial effects on the positive values, social skills, self-identity, and physical skills of children with special needs, although not significant.

Links Between Physical and Mental Health: Assessment of Therapeutic Riding's Effect in Children with Special Needs

Physical activity is a major factor in influencing and promoting well-being and enhanced mental health in individuals (Clow & Edmunds, 2014). It has been proposed that physical health has an underlying biological effect on people which in turns plays a part in influencing their mental health and well-being (Clow & Edmunds, 2014). Not only does physical activity play an important role in health for adults, but has been shown also to play a crucial part for young children growing up (Clow & Edmunds, 2014). In addition, whether any kind of physical activity benefits the social and mental well-being of children with or without physical or mental disorders is an ongoing question. Evidence gathered by Lawlor and Hopker (2001) showed that regular physical activity had benefits in preventing the onset of anxiety and depression, and also in treating these disorders. More and more evidence suggests that physical activity has potential benefits for people with schizophrenia and other mental health illnesses, such as phobias also (Holley, Crone, Tyson, & Lovell, 2011; Saxena, Clements, & Singh, 2005). Physical activity has been shown to improve the well-being of an individual's mental health and its associated social and behavioural factors (Clow & Edmunds, 2014). Overall, consistent evidence shows that physical activity has positive effects on the mental well-being of an individual and that it reduces depression and risk of stress in the population (Pawlowski, Downward & Rasciute, 2011).

Along with the benefits that physical activity alone has been shown to provide for humans, physical activity combined with animals also appears to offer many advantages to human health. First, the general effects of animals on humans have been widely researched. A review by Wells (2009) showed that pets could have positive effects on the short-term and long-term health of an individual, such as lowering blood pressure and heart rate and even decreasing

stress. Previous research has also shown that animals alone can reduce depression, loneliness, and anxiety and have enhancing effects on the self-sufficiency, competence and, self-esteem of an individual (e.g., Beck & Katcher, 1984; Folse, Minder, Aycock & Santana, 1994; Berget & Grepperud, 2011).

Furthermore, the positive effects that animals have on humans can be combined with physical activity, to provide a combined therapy for the well-being of individuals. One form of such therapy is animal-assisted therapy, which is when animals are used in a goal-enhancing environment in which treatment is implemented. Animal-assisted therapy is shown to have cognitive, psychological, and social benefits in humans (Fine, 2006). In a study conducted by Sams, Fortney, and Willenbring (2006), 22 children with autism spectrum disorder participated in various activities that targeted sensory integration, motor skills, language use, and sensory skills. This study compared the standard techniques of therapy that were used by an occupational therapist (OT) in treatment, to animal integrated therapy conducted by an OT. Standard techniques of therapy consisted of using bean bags to demonstrate climbing, playing on teeter-totters and swings, communicating with peers, creating art work, working on puzzles, etc. Animal integrated therapy consisted of riding on llamas, training llamas to follow instructions, petting, stroking, brushing and feeding llamas, singing to or about animals, throwing balls for dogs, etc. It was hypothesized that the animal integrated therapy would elicit an increase in language use and more social interaction amongst the children. It was found that the children engaged in significantly more social interactions and showed an increased use in language skills in the animal integrated OT conducted therapy, as compared to the standard OT therapy. A similar study conducted by Berget, Ekeberg, and Braastad (2008) involved a 12-week intervention with psychiatric patients involving farm animals. These individuals were to engage

only in interactions with the farm animals when they visited the farm. These interactions consisted of brushing, washing and looking after the animals, riding the horses, cleaning the sheds, milking the cows, etc. It was found that the farm animals had positive influences on the patients who had long-lasting psychiatric symptoms. These positive influences led to an increase in self-efficacy and coping abilities. Another form of animal integrated therapy used in the past has been therapy with dolphins. Antonioni and Reveley (2005) had participants familiarize themselves with dolphins and then engage in spontaneous and free interactions with them, such as snorkelling. It was found that the therapy with dolphins improved the symptoms of depression in individuals. From these findings consisting of animal-human interactions, it appears that general animal assisted therapy or animal interactions have beneficial effects on humans.

A more widely used form of animal integrated therapy that has been used over many years is hippotherapy. This therapy is conducted using a horse under the supervision of a licensed health care professional, such as an OT, physical therapist (PT), physical therapy assistant (PTA), occupational therapy assistant (OTA), or a speech-language pathologist (Sterba, 2007). In this form of therapy, the movement of the horse is used as a therapeutic tool by the therapist to help improve any specific area in an individual's functioning, as it integrates the emotional and physical capabilities of the person. The patient or individual rides the horse as a form of therapy which integrates physical exercises, which are conducted on the horse, and the horse's natural movement, to give the individual a combined, effective form of therapy. Some areas that hippotherapy can be used to improve are balance, posture, or mobility of an individual as well as it can assist in improving a person's walking ability (Sterba, 2007). It has been suggested also that hippotherapy is a more successful form of therapy, compared to standard therapy, in helping an individual improve his or her self-identity (Bass, Duchowny, & Llabre,

2009). Bass et al. (2009) suggest that this may be due to many factors, such as that the experience of riding a horse may have been rewarding which led to more involvement and improvement in therapy. Another reason for hippotherapy being more beneficial than standard therapy may be because it is stimulating as it involves various sensory channels which are utilized. The multisensory channels involved in horseback riding may have given the children a more encompassing and engaging form of treatment (Bass et al., 2009).

Even the simple physical stimulation of hippotherapy can be of benefit to an individual as previous studies have demonstrated. A study conducted looking at the effect of hippotherapy on children by Sterba, Rogers, France and Vokes (2002) looked at 17 children with cerebral palsy (CP). These children initially displayed various levels of gross motor functioning and were assessed in the study on various domains such as laying and rolling, sitting, crawling and kneeling, standing and walking, and running and jumping. It was hypothesized that hippotherapy would significantly improve the gross motor functioning in these children. At the end of the study it was found that indeed hippotherapy did significantly benefit all five domains assessed of gross motor functioning.

Similar to hippotherapy, another form of therapy is horseback riding therapy. This is conducted by non-health care instructors and assistants who have been previously trained and have a background in the rider's disabilities and the methods that are to be used for a safe therapeutic session (Sterba, 2007). Therapeutic riding (TR) programs, another name for this horseback riding therapy, were first established around the mid 1900s (DePauw, 1986). The use of horseback riding as a therapy, however, goes as far back as ancient Greece where it was used to enhance the physical and mental well-being of individuals (Snider, Korner-Bitensky, Kammann, Warner, & Saleh 2007).

Over the years, TR has been shown to have physical, emotional, and social benefits. Physical benefits of TR are that it strengthens the muscles of the individual which helps improve the coordination and balance of the person (SARI Therapeutic Riding, 2015). It has been found that TR helps with strengthening and promoting the recruitment of muscles that are important for the rider to use for walking and standing (Drnach, O'Brien, & Kreger, 2010). Other physical benefits of TR are that it provides the rider with warmth from the horse's body, improves blood circulation, reduces high muscle tone and thus provides relaxation to tight muscles (Davis et al., 2009; Snider et al., 2007). Riding also helps improve the stamina and physical fitness of the rider (SARI Therapeutic Riding, 2015). Some emotional benefits of TR are that it provides a sense of freedom for individuals who use assistive devices and also enables them to gain a sense of independence. The feeling of being in control of a large animal helps build the confidence of the person and also increases their self-esteem (SARI Therapeutic Riding, 2015). Lastly, social benefits of TR include increased social interactions with other peers, volunteers, and riders, which in turn helps increase the confidence and language skills in individuals (Murray, 2011; SARI Therapeutic Riding, 2015).

To look at the effects of TR, a study conducted by Drnach et al. (2010) consisted of a five-week TR program involving children who had CP that took part in one hour riding sessions per week. The children were encouraged to take part in various activities related to the child's posture, strength, balance, and flexibility, while the child was riding the horse. The results of this study showed that even the limited, one hour TR sessions had positive effects on the gross motor functioning of the children.

Similarly, a study conducted by Bass et al. (2009) looked at the effect of TR on children with special needs. Nineteen children with autism were exposed to a 12-week TR intervention

while 15 children with autism were placed in a control group. These children were assessed on social functioning via pre- and post-test questionnaires, which measured sensory seeking and social responsiveness measures. It was hypothesized that the children who were exposed to the 12-week TR intervention would show improvements in social functioning, as compared to the autistic children who were not exposed to the TR intervention. It was found that the 19 autistic children in the TR intervention had significant social improvements as compared to the 15 autistic children who were not provided with TR.

Carey (2010) examined the effect of TR on a range of physical and mental factors, assessing the social skills, physical skills, and self-perceptions of special needs children in a one-week summer camp setting. It was hypothesized that after the summer camp session was over, there would be an increase in social skills, physical skills, and self-perceptions. These factors were measured on pre- and post-observational checklists as well as parent and child questionnaires. The results of this study were that TR had positive effects on the children leading to an increase in domains of social skills, physical skills, and self-perceptions. To further the research done by Carey (2010), Murray (2011) conducted a similar study in a different context. Murray (2011) examined the effect of weekly TR sessions, as opposed to summer camp TR sessions, and their effect on social skills, physical skills, and self-perceptions in 18 children with special needs. Murray (2011) hypothesized that TR would improve the behaviour of the children, especially their self-perceptions. The same pre- and post-observational checklists and parent questionnaires used by Carey (2010) were used to assess the social skills, physical skills, and self-perceptions of the children. It was found that TR had a positive effect on all domains observed. It is evident from the studies conducted by Bass et al. (2009), Carey (2010), and Murray (2011) that TR does improve the social functioning in children from a special needs population. In the

studies conducted by Carey (2010), Murray (2011) and Drnach et al. (2010) it is also evident that TR has positive effects on the physical well-being of children with special needs.

Based on these previous findings, TR seems to have positive effects on children with special needs in social, physical, and emotional domains. However, a limited number of studies have been dedicated to investigate the effect of TR on social, emotional and physical domains, while also comparing the differences between people who have various special needs diagnoses and how they perform on those measures. The current study will investigate the effect of TR on physical health while also focusing on social skills, self-identity, and positive values. In addition, the current study will obtain special need diagnosis information from the children to further analyze differences of TR and the effect it has on social skills, self-identity, physical skills and positive values on children with various diagnoses. It is hypothesized that TR will have a greater effect on physical skills, along with social skills, positive values and self-identity, as measured by an observational checklist, in children who have less severe special needs diagnoses.

Method

Participants

Participants were recruited from SARI Therapeutic Riding Farm, located near London. Those participants who signed up for both the Fall and Winter riding session were eligible to participate. Children who participated in this study also had special needs (e.g., autism spectrum disorder, learning disability, cerebral palsy, Down syndrome, etc.). Fourteen participants were observed, ages ranged from 7-19 years of age ($M = 10.07$), of which 3 were males and 11 were females. From the 14 participants observed, only 12 completed both the Fall and Winter riding session observations, from which 2 were males and 10 were females ($M = 10.07$). Based on observable physical abilities, social interactions, and psychological well-being before the

observational testing, the children were grouped into having either more severe diagnoses or less severe diagnoses. Children who were grouped as having more severe diagnoses were either more physically impaired, had little to no social interactions with other people, or had difficulties in day-to-day tasks, such as putting on their riding helmet, or walking. Children who were grouped as having less severe diagnoses were more physically able, such as to walk, run, follow instructions, etc., and had no problem in social interactions with other people, as well as conducting basic activities. The children were grouped on the basis of the researcher's observations.

Materials

Observations were conducted using a 17-item observational checklist. The checklist included social, emotional, psychological and physical measures (see Appendix).

The social, emotional, and psychological measures were derived from a questionnaire initially developed by Henderson, Thurber, Schueler Whitaker, Biasleschki, & Scanlin (2006), copyrighted by the ACA (© American Camping Association, Inc.). These questionnaires were designed and validated and have been used in various camp settings. These questionnaires were then revised and formatted to use with weekly TR sessions. Carey (2009) developed the observational checklist using the four domains assessed in the original questionnaires: social skills, self-identity, positive values, and physical skills. The examples of behaviors listed on the checklist were for memory enhancing purposes only. Statements such as “believes others likes him/her” and “willingness to try new activities” addressed positive self-identity. Statements such as “gets along well with others” and “demonstrates leadership” addressed social skills. Statements such as “acts helpful and respectful” and “makes decisions thoughtfully” addressed the domain of positive values. Lastly, statements like “learns new skills easily” and “shows

improvement in some activity” addressed physical skills. The ratings on the checklist were based on the questions from the original questionnaire by Henderson et al. (2006). The researcher was acquainted with the questions from this questionnaire and based observational ratings upon this questionnaire’s constructs. The four domains were measured on a four-point Likert scale, with one being “strongly disagree” and four being “strongly agree”. Positive self-identity consisted of four questions, social skills consisted of three questions, positive values consisted of two questions, and physical skills consisted of two questions, in addition to part two of the observational checklist.

The physical measures on the checklist were adapted from the SARI Therapeutic Riding’s Assessment Form, used by Occupational Therapists to assess the children before therapy sessions began. This section was comprised of questions regarding level of support, posture, mobility, and mounting. Five of the physical health items were measured on a four-point Likert scale, with one being “extremely compromised” and four being “no difficulty”. One of the physical health questions, regarding number of sidewalkers, was measured using a two-point Likert scale, where zero was “no side-walker/difficulty” and two was “two side-walkers/extremely compromised”. This question was reversed scored.

Observational Procedure

Parents of children ranging from 5 to 19 years of age were emailed a call for participants through SARI, giving a brief description of the study being conducted. The parents were also given a letter of information and informed consent in the child’s folder at SARI, half way through the Fall riding session, which was around the seventh or eighth lesson. Parents then had the chance to read the information and provide consent for their child to participate in the study. When parents provided informed consent, their child was then observed during the tenth riding

lesson during the Fall riding session. The Fall session was 14 weeks long. The researcher used the observational checklist to observe the social, emotional, psychological, and physical measures of the child. The children were again observed during the eight lesson of the Winter riding session, which was 10 weeks long. The same observational checklist was utilized during these observations also.

All the information was collected and coded to ensure confidentiality and anonymity of the participants who were observed.

Results

The observational checklists were scored in two sections. The first section consisted of the social, emotional, and psychological measures which were social skills, positive self-identity, and positive values, respectively. These three domains were scored using a four-point Likert scale where one was “strongly disagree” and four was “strongly agree. This section had a total possible score of 36, comprised of positive self-identity that had four questions, with a total score of 16, social skills which had three questions, with a total score of 12, and positive values which had two questions with a total score of eight. The second section consisted of the physical measures, which were divided into two parts. Two physical skills questions were measured on a two-point Likert scale where zero was “no side-walker/difficulty” and two was “two side-walkers/extremely compromised”. This question was reversed scored with a total score of two. Seven physical skills measures were assessed using a four-point Likert scale where one was “extremely compromised” and four was “no difficulty”, with a total possible score of 28. Overall, the observational checklist had a total possible score of 66, meaning no/minimal impairment.

A repeated-measures Analysis of Variance (ANOVA) was conducted for each of the four domains being measured for each of the two diagnoses, more and less severe. The four domains being positive self-identity, social skills, positive values, and physical skills. The main effect of time point was found to be non-significant for all four domains: positive self-identity, $F(1, 10) = 1.63, p = .23$; positive values, $F(1, 10) = 2.23, p = .17$; and physical skills, $F(1, 10) = 1.82, p = .21$. As for social skills, this domain approached statistical significance, displaying a trend, $F(1, 10) = 3.31, p = .099$. Despite the non-significant main effects of time, participants with both more and less severe diagnoses demonstrated slight increase from pre-observation to post-observation in all four domains.

The first repeated-measures ANOVA was conducted for positive self-identity. There was no interaction of time point and diagnosis found, $F(1, 10) = 0.76, p = .41$. However, there was tendency for improvement shown for both children with less severe and more severe diagnoses for positive self-identity over time. Children with more severe diagnoses ($N = 5$) showed a small increase on the domain of positive self-identity from pre-observation ($M = 10.00, SE = 0.45$) to post-observation ($M = 11.50, SE = 0.60$), compared to children with less severe diagnoses ($N = 7$) who showed less change from pre-observation ($M = 14.57, SE = 0.57$) to post-observation ($M = 14.86, SE = 0.86$). Children with more severe diagnoses showed a 9.38% increase in positive self-identity scores whereas children with less severe diagnoses showed a 1.81% increase in positive self-identity scores (see Figure 1). Despite the non-significant interaction between time point and diagnoses, there was a significant overall main effect of diagnosis for positive self-identity found, $F(1, 10) = 12.71, p = .005$.

The second repeated-measures ANOVA was conducted for social skills. Again, there was no interaction found for time point and diagnosis, $F(1, 10) = 0.020, p = .89$. However, there was

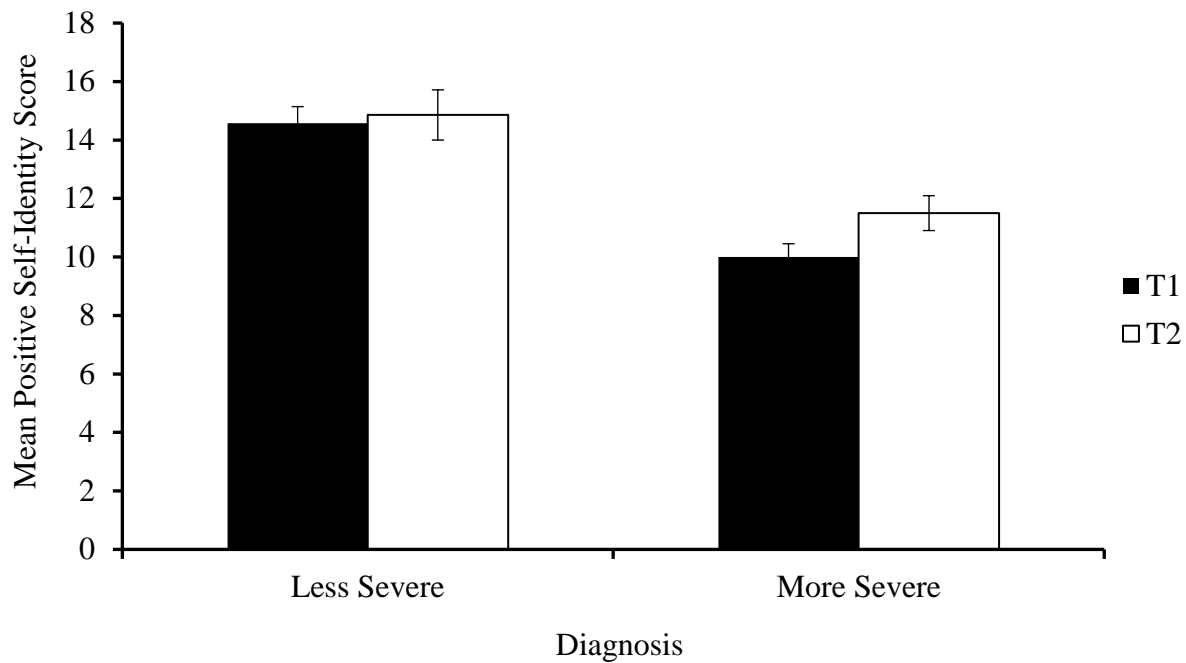


Figure 1. Mean scores for positive self-identity in children with less severe diagnoses compared to children with more severe diagnoses from pre-observation to post-observation. Error bars reflect standard error of the mean.

tendency for improvement shown, again for both children with more and less severe diagnoses. Children with less severe diagnoses showed a small increase in the domain of social skills from pre-observation ($M = 10.50$, $SE = 0.57$) to post-observation ($M = 11.36$, $SE = 0.30$), compared to children with more severe diagnoses, who showed a slightly smaller increase from pre-observation ($M = 7.10$, $SE = 0.30$) to post-observation ($M = 7.70$, $SE = 0.57$). Children with less severe diagnoses showed a 7.17% increase in social skills whereas children with more severe diagnoses showed a 5% increase in social skills scores (see Figure 2). Despite the non-significant interaction between time point and diagnoses, there was a significant overall main effect of diagnosis for social skills found, $F(1, 10) = 16.75$, $p = .002$.

The third repeated-measures ANOVA was conducted for positive values. Again, there was a no interaction found for time point and diagnosis, $F(1, 10) = 0.79$, $p = .396$. However, children with both more and less severe diagnoses showed improvement over time. Children with less severe diagnoses showed a small increase in the domain of positive values from pre-observation ($M = 7.00$, $SE = 0.345$) to post-observation ($M = 7.79$, $SE = 0.15$), compared to children with more severe diagnoses, who showed a lesser increase from pre-observation ($M = 4.50$, $SE = 0.29$) to post-observation ($M = 4.70$, $SE = 0.54$). Children with less severe diagnoses showed a 9.88% increase in positive values whereas children with more severe diagnoses showed a 2.5% increase in positive value scores (see Figure 3). In spite of the non-significant interaction between time point and diagnoses, there was a significant overall main effect of diagnosis found for positive values, $F(1, 10) = 12.34$, $p = .006$.

The last repeated-measures ANOVA was conducted for physical skills. Again there was no interaction found between time point and diagnoses, $F(1, 10) = 1.82$, $p = .21$. However, children with more severe diagnoses tended to show some improvement over time. Children with

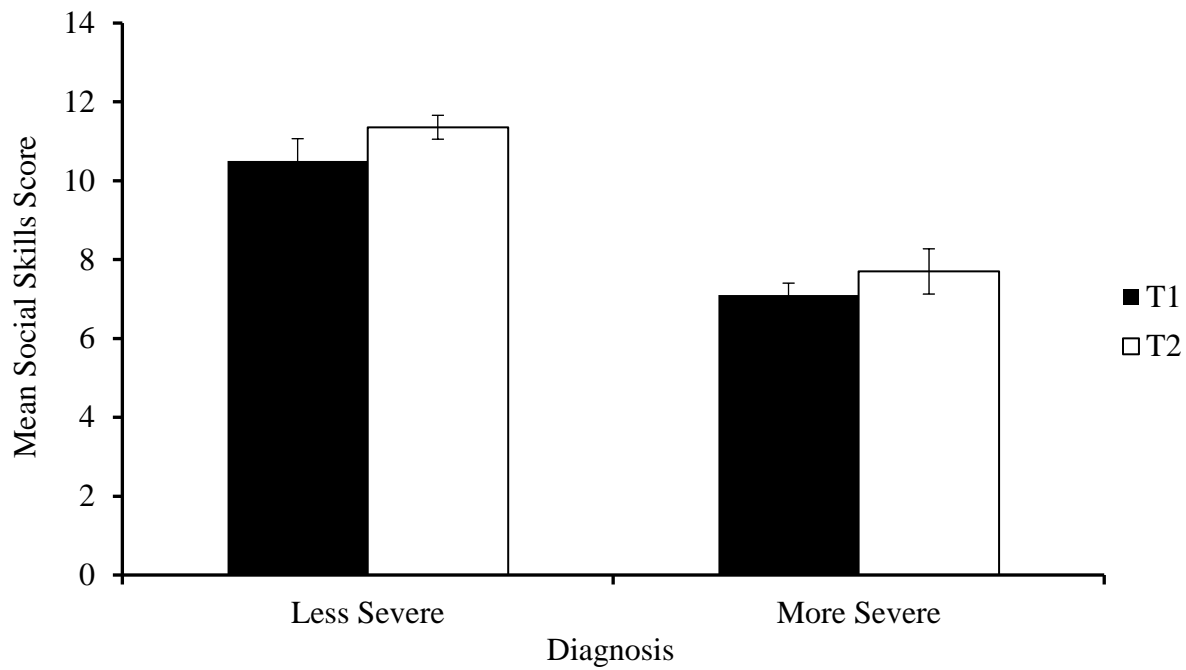


Figure 2. Mean scores for social skills in children with less severe diagnoses compared to children with more severe diagnoses from pre-observation to post-observation. Error bars reflect standard error of the mean.

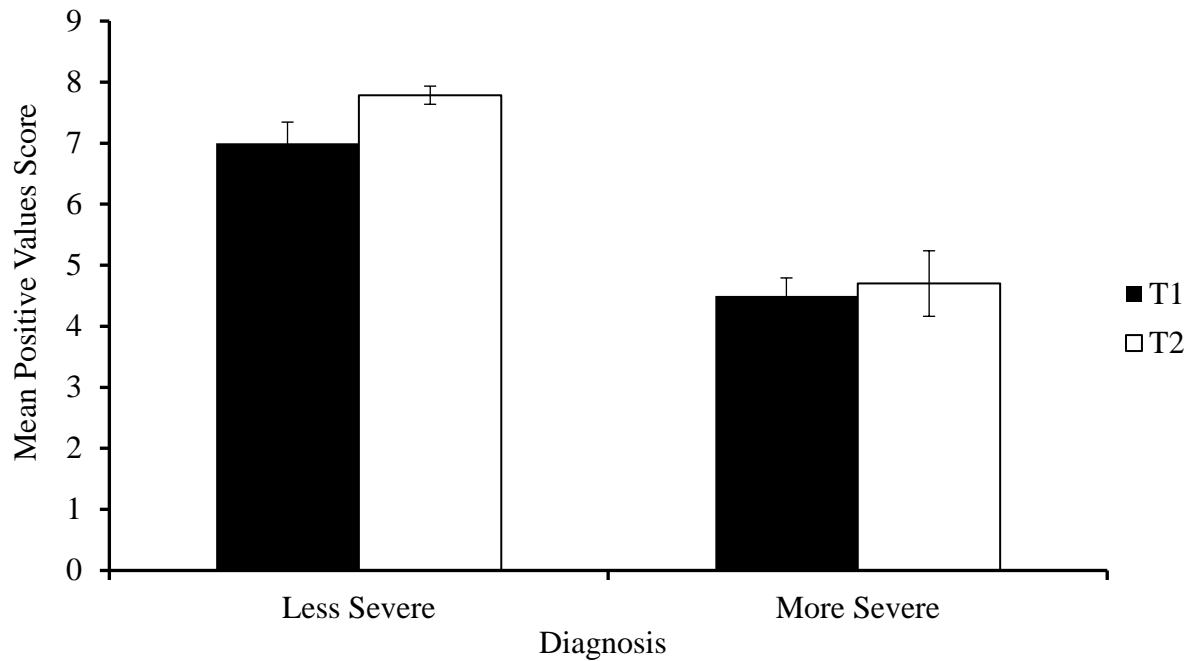


Figure 3. Mean scores for positive values in children with less severe diagnoses compared to children with more severe diagnoses from pre-observation to post-observation. Error bars reflect standard error of the mean.

more severe diagnoses showed a greater increase in the domain of physical skills from pre-observation ($M = 19.90$, $SE = 0.95$) to post-observation ($M = 21.40$, $SE = 1.06$), compared to children with less severe diagnoses, who showed no increase from pre-observation ($M = 29.43$, $SE = 0.23$) to post-observation ($M = 29.43$, $SE = 0.41$). Children with more severe diagnoses showed a 5% increase in physical skills scores whereas children with less severe diagnoses showed a 0% increase in physical skill scores, demonstrating a ceiling effect (see Figure 4). Despite the non-significant interaction, there was a significant overall main effect of diagnosis found for physical skills, $F(1, 10) = 23.07$, $p = .001$.

Discussion

The results for this study were found to be non-significant in all four domains. It was expected that TR would have a greater effect on the physical skills, along with social skills, positive values, and positive self-identity in children who have less severe special needs diagnoses compared to children who have more severe special needs diagnoses. Even though a non-significant increase was found for both children with more and less severe diagnoses for all four domains, slight increase in scores for the four domains was still observed from pre-observation to post-observation. As expected, even though the results were not significant, children with less severe diagnoses showed more of an increase on the domains of positive values, and social skills, compared to children with more severe diagnoses who did not show as much of an increase in these domains. Contrary to the initial hypothesis, children with more severe diagnoses showed a slightly larger increase on self-identity scores from pre- to post-observations compared to children with less severe diagnoses. Scores on the physical skill measure showed a ceiling effect for children with less severe diagnoses. Despite the non-significant increase in all four domains between the two-time points, both children with more

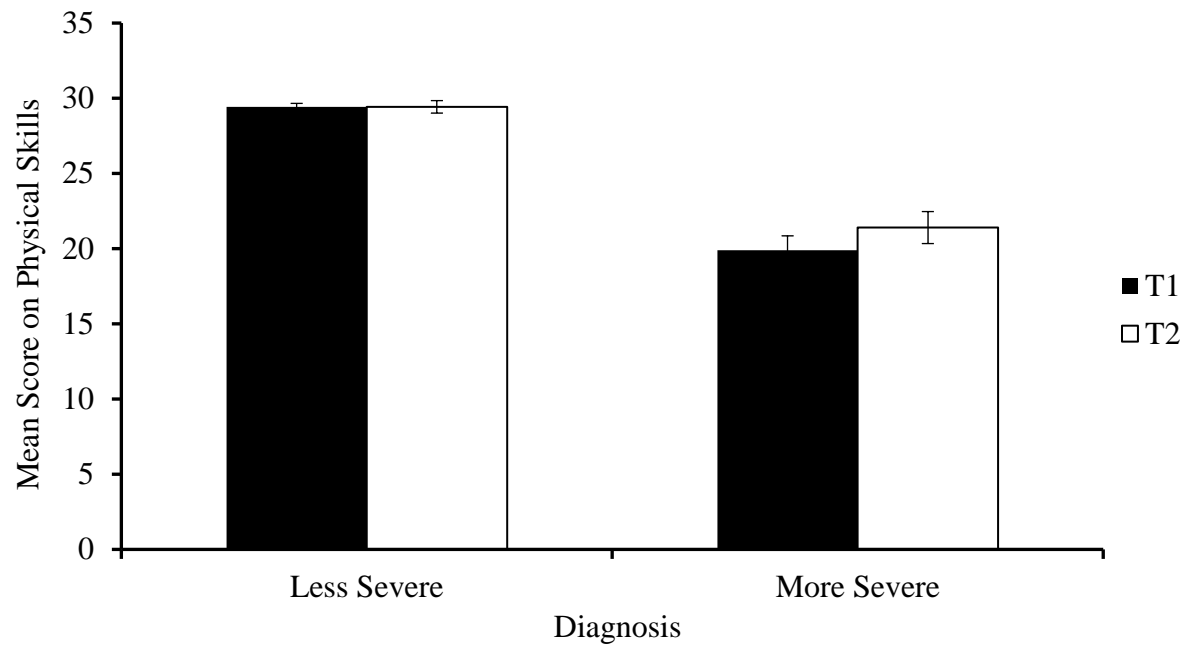


Figure 4. Mean scores for physical skills in children with less severe diagnoses compared to children with more severe diagnoses from pre-observation to post-observation. Error bars reflect standard error of the mean.

and less severe diagnoses did show a trend for increases in the domain of social skills from pre-observation to post-observation. It was shown from the observational checklists that less severe diagnosis children increased the most on social skills from pre-observation to post-observation by 7.2% and children with more severe diagnoses showed an increase by 5% from pre-observation to post-observation. Although not significant, this increase from pre-observation to post-observation for children with both more and less severe diagnoses suggests that there is a trend of an effect that TR has on social skills. Furthermore, a significant difference was found between the more and less severe diagnosed children, as would have been expected. It can be concluded from these results that children with more and less severe diagnoses do differ in the effect that TR has on their social skills, positive values, physical skills, and positive self-identity, however, these increases are not significant enough to show a beneficial effect of TR. Although not significant, both children with more and less severe diagnoses showed a trend that TR did play a more beneficial effect on social skills as compared to the other three domains from pre-observation to post-observation.

These results are slightly consistent with previous research as there are increases in scores for social skills, positive values, physical skills, and positive self-identity from pre-observation to post-observation, however these increases are not significant. In previous research looking at the same four domains using the observational checklist for special needs children, Murray (2011) found significant results, however, parent questionnaires which also assessed the same four domains found non-significant differences from pre-riding session to post-riding session. A reason for the contradicting results in Murray's (2011) study could be since parents see their children all the time they may have not seen a difference in the child's behaviour in the four domains, whereas Murray (2011) observed the children two times in the approximately

four-month time-period and thus may have been able to observe more of a difference in the four domains due to TR. Similarly, in the study conducted by Carey (2010), special needs children showed an increase in all four domains from pre-camp session to post-camp session. Unlike the results for the current study where there were increases shown in pre-observational to post-observational scores for all four domains, the results shown in Carey's (2010) study were significant increases for all four domains. These results as well as the results from Murray (2011) demonstrate that TR has beneficial effects on the social skills, physical skills, positive values, and positive self-identity of special needs children over time, which are slightly contrary to the results in the current study.

The current study found a trend for the domain of social skills, suggesting that TR had a beneficial effect on the social skills of children with special needs, as compared to the other three domains. In previous research by Wells (2009), it was suggested that the presence of an animal or pet itself can reduce feelings of loneliness and isolation and make the individual feel more at ease. In addition, Sams and colleagues (2006) found that children who engaged in TR, which is the combination of therapy and the presence of an animal, had a significant increase in the social interactions which they engaged in and their use of language. The current study also had a tendency to show similar results, although not significant, the children with special needs, both less and more severe, showed a positive trend in social skills from pre-observation to post-observation. The trending results from the current study suggest that the interactions that the children have while taking part in TR do play an important role in benefiting their overall social skills. For example, interacting with volunteers and other riders can increase the confidence a child has, also, the social situations the child is put into during TR such as being involved in their own therapy can also increase their social interactions and confidence. As mentioned before, one

of the benefits that TR has been found to have are social benefits, such as increasing confidence in riders as well as language skills, as the children take control of their therapy and the horse on which they ride (SARI Therapeutic Riding, 2015). A study conducted by Carey, Murray, and Barnfield (2012) also demonstrated that TR increased social skills scores and the confidence that children displayed during summer camp sessions. It can be said that the results of the current study had a tendency to demonstrate similar results to these previous studies as it showed a positive trend for children with more and less special needs diagnoses, from pre-observation to post-observation.

As for the domain of physical skills, children with less severe diagnoses showed a ceiling effect with their pre- and post-observational scores. These children had scores which were the maximum number of scores they could have received on the physical skills section of the observational checklist for pre-observation. Later during post-observations, these children had the same scores as their physical skills did not deteriorate over time, presumably due to TR, and thus remained the same. Having the same pre- to post-observational scores for physical skills, children with less severe diagnoses demonstrated a ceiling effect. This means that the effects of TR on the children with less severe diagnoses leveled out and did not play a significant role on their physical skill level anymore. In the beginning, TR may have played a larger role in benefiting the physical health of the children, however, the more time the children may spend in TR sessions, the less effect TR has on their physical skills. Instead, later on, the benefits that TR has may extend to the social skills, positive values, and positive self-identity of the children, rather than the physical skills.

Overall, the results of the current study demonstrate that children with both more and less severe diagnoses showed a slight increase in the domains of social skills, physical skills, positive

values, and positive self-identity due to TR, however, children who have less severe diagnoses showed more of an increase, as well as a higher baseline to start during their pre-observations, as compared to children who had more severe diagnoses.

The results of this study indicated non-significant effects of TR on the four domains comparing children with more and less severe diagnoses, contrary to previous research, suggesting some limitations in the study. Firstly, only a small group of children (14) participated in the observational research, of which two did not partake in the post-observation session, leaving a total of twelve participants who took part in the full study. Secondly, the researcher only observed the children in a three-month span, which likely is not enough time to observe beneficial effects of any kind of therapy, therefore contributing to the non-significant results. Lastly, this study did not take into account the previous or lack of previous history each child has had of TR. Some children were in the SARI TR program for several years, while some had just joined. The variation of TR experience, and lack of participants observed could have contributed to the non-significant results shown.

Due to the lack of research looking at the effects of TR on children with different diagnoses, there are many potential suggestions for future research. Firstly, conducting observations with a larger participant sample size would be necessary, especially more participants who fall into both the less severe diagnoses and more severe diagnoses groups. Secondly, doing observational research over a longer time period than three months would show more effects of TR, either beneficial or detrimental. For example, if pre-session observations were made approximately a year before post-session observations then the effects of TR on different diagnoses would be more evident. Lastly, taking into account the history of TR or any other therapy would also show different results. Overall, suggesting an integrated form of

therapy, such as TR, for children with special needs seems to be a beneficial form of therapy as it includes positive aspects from both physical activity and animal interactions, both which have advantageous effects on humans.

Although not-significant, the results from this study show that TR had some benefits on the domains assessed, physical skills, positive values, social skills, and positive self-identity, as they displayed some increase from pre-observation to post-observation. The positive trend of social skills from pre- to post-observation demonstrated the greatest tendency of increase due to TR sessions for special needs children. Overall, it appears that therapeutic riding has some benefits on children with special needs on their social skills, physical skills, positive values, and positive self-identity, especially if done over a longer period of time.

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Appendix
T1/T2 Riding Session Observational Checklist

Rider's code number: _____ Session observed: date _____ T1 T2

Part I: Social/Emotional/Psychological

Mark the presence/absence of the behaviour at the first observed lesson of the riding session and on the last observed session on a scale of 1 to 4:

1 being "strongly disagree"

2 being "disagree a little"

3 being "agree a little"

4 being "strongly agree":

Believes other likes him/her E.g. of behaviour: Is at ease around others; Eager to participate	1	2	3	4
Feels good about him/herself E.g. of behaviour: Shows others projects s/he made; Seems in generally good mood	1	2	3	4
Acts confidently and independently E.g., of behaviour: Volunteers to go first; Willingness to try; Follows rules without being reminded; Works on his/her own	1	2	3	4
Makes new friends easily E.g. of behaviour: Lets others join in activities; Keeps promises	1	2	3	4
Gets along well with others E.g. of behaviour: Speaks/acts politely; Takes turns	1	2	3	4
Demonstrates leadership E.g. of behaviour: Helps lead activities; Other kids look up to him/her	1	2	3	4
Acts helpful and respectful E.g. of behaviour: Shares/offers to help	1	2	3	4
Makes decisions thoughtfully E.g. of behaviour: Talks to others for advice; Thinks about consequences	1	2	3	4
Willing to try new activities	1	2	3	4
Learns new skills easily	1	2	3	4
Shows improvement in some activity E.g. of behaviour: Shows better coordination; Shows improved understanding of certain activities	1	2	3	4

Part II: Level of Physical Support and Mobility

Side walkers: 0 1 2

Mark the level of physical support/posture at the first observed riding session and on the last observed riding session, on a scale of 1 to 4:

- 1** Extremely Compromised
- 2** Compromised
- 3** Some Difficulty
- 4** No difficulty

Level of support (<i>when on the horse</i>) Full support, knee support, ankle support, moral support	1	2	3	4
Posture (<i>when on the horse</i>) Very poor, poor, good, excellent	1	2	3	4
Balance (<i>when on the horse</i>) Very poor, poor, good, excellent	1	2	3	4
Mobility Very poor (i.e., wheelchair), poor (i.e., assistive device), good (i.e., not full mobility, but no assistance), excellent (i.e., full mobility)	1	2	3	4
Mounting Mechanical lift, placed by instructor, crest, croup	1	2	3	4
Additional information (Observed)				